GEOGRAPHIC SCHOOL BULLETINS

THE NATIONAL GEOGRAPHIC SOCIETY, WASHINGTON 6, D.C.

VOLUME XXXVII, NUMBER 5, NOVEMBER 3, 1958 . . . *To Know This World, Its Life*

NATIONAL GEOGRAPHIC PHOTOGRAPHER JOSEPH BAYLOR ROBERTS

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This industrial prosperity rests on a shaky agricultural foundation. Japan has too many mouths to feed. Although the four main islands—Hokkaido, Honshu, Shikoku, Kyushu—spread more than 1,200 miles along Asia's coast they offer slightly less land area than California, with almost seven times California's population. Only 15 per cent of the mountainous land can be farmed—an area half the size of Ohio. Yet before another year passes nearly 1,000,000 new mouths will join Japan's 92,000,000.

In order to feed these people, two of every five Japanese are farmers—the islands' medieval backbone. They toil on farms so tiny (an average of 2.5 acres compared with 165 acres in the United States) that farmers say they are "like forehead of cat." In flooded fields sprouts rice, Japan's staff of life. No week-end gardener in the United States gives his prize rose bushes as much care as a stalk of rice gets on Honshu. Farmers ladle fertilizer a spoonful at a time upon growing plants to get the highest rice yields in Asia.

There is little space to graze meat animals, so the Japanese eat fish instead. Some 400,000 Japanese fishing boats roam Pacific waters to supply home needs. Still the country does not quite

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SACRED MOUNT FUJI (below) rises over a patchwork of upland fields bountiful with grain and vegetables.

HORACE BRISTOL

EVERY DAY when fishing is good thousands of Japanese boats return to coastal villages laden with sardines, herring, and other ocean delicacies. A good haul fills several hundred 85-pound baskets. Hard-working husband-wife teams lay skid tracks so boats can be dragged high on the beach. Refrigerated vessels speed the catch to market. But fishing and farming cannot produce enough food for Japan's crowded millions. They must manufacture and trade abroad to eat.

NATIONAL GEOGRAPHIC PHOTOGRAPHER JOSEPH BAYLOR ROBERTS

Rebirth For Industrial Japan

JAPAN HAS EMERGED from the ashes of World War II heavily industrialized, bursting with energy, and overpopulated.

In Tokyo, office buildings and department stores of concrete and steel push the skyline upward. Along the road to Yokohama fire belches from open-hearth furnaces, smoke puffs above electric plants and oil refineries. For 600 miles, from Greater Tokyo to Nagasaki, stretches a complex of textile and chemical plants, steel mills, and shipyards. Buyers can take delivery on anything from locomotives to badminton rackets.

In the shadows of mammoth, streamlined factories Japan's cottage workshops hum. In their dimly-lit interiors looms throb, hammers pound, and skillful fingers fashion any small product from kimono silks to chess sets. Back street workshops employing from three to 100 workers fabricate about 40 per cent of the nation's products. Their importance is declining as powerful prewar corporations, dissolved during the American occupation, return to dominate Japan.

The statistics are impressive. Production has doubled in the last decade. New tankers and cargo vessels leave shipyards at such a rate that Japan recently passed Great Britain as the world's leading shipbuilder. Cotton textiles roll off Osaka's high-speed printing machines. Despite inroads by synthetics, textiles (below) provide a third of Japan's exports and rank it third in world production. Only five nations make more steel.

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CHARLES DEL VECCHIO, WASHINGTON POST AND TIMES HERALD

Your Bright, New Smithsonian

SMITHSONIAN INSTITUTION

WHEN SOMEONE SAYS "museum" do you think of cobwebs and dust? If so, you probably haven't visited one recently.

Modernization of museum techniques has progressed so far that the Smithsonian Institution in Washington, D. C., for instance, has dropped its reputation as "Uncle Sam's attic" and picked up new glamour as the nation's cultural show place. Thousands of teacher-student groups from near and far visit the Smithsonian every year. Those returning now to the echoing halls are amazed at the Institution's bright new features.

Where battalions of dingy—if interesting—items once called rather feebly to the eye, now color, dramatic lighting, and modern layout command attention. The result is more stimulating, more educational—and easier on your feet.

Entire halls have been redone. Stuffed birds that once stood disconsolately on flat shelves now roost on tree branches in groupings that show their habits and places in the scheme of the world.

Historic machines such as the Civil War steam engine framing a school class above are displayed to best advantage in the new Power Hall, where students can trace the development of man's mechanical muscles. Under construction is a new building for history and technology.

With such bright displays the Smithsonian lives up to part of its motto: *For the Increase and Diffusion of Knowledge Among Men.*

These words were written by James Smithson, an Englishman who left his fortune to the United States to found the Institution.

In the 111 years since it began, the Smithsonian has found ways to diffuse knowledge to millions who cannot visit its halls. Books, pamphlets, and traveling displays spread the fruits of its research.

PHOTOGRAPHS BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JOSEPH BAYLOR ROBERTS

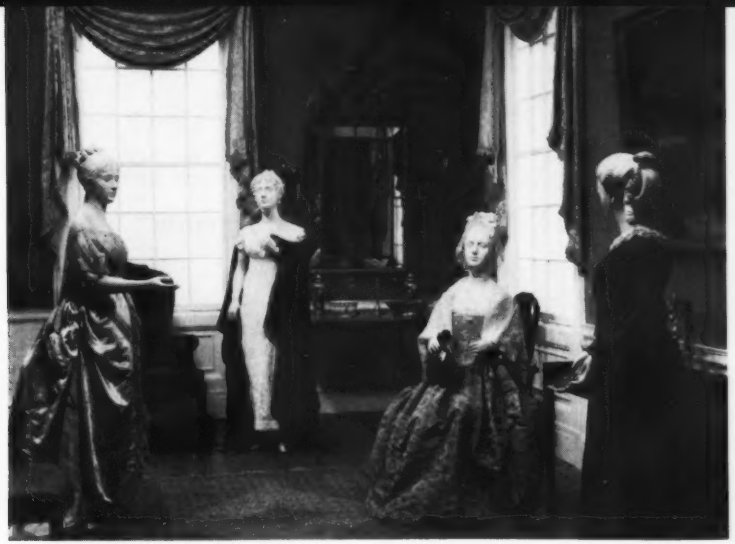
DEFT JAPANESE fingers produce top-quality optical instruments—cameras, binoculars, microscopes. They set the pace in Japan's bid to capture world markets with superior products of original design. Precision lenses ground at this factory (left) refute the charge that Japanese manufacturers too often pirate foreign designs. From less than a dozen large concerns—some employing more than 1,000 workers—comes the entire camera output.

make it. Twenty per cent of its food—wheat, corn, even rice—is imported.

Japan searches for new markets, a better-balanced economy, full employment. To these ends she is diversifying her manufactures, setting high standards of quality and original design. If traditional exports of canned tuna or textiles dwindle they can be replaced by automobiles, sewing machines, and cameras.

Leaving no possible market untapped, Japanese businessmen build overseas—a steel mill in Brazil; a pulp mill in Alaska; a fashionable department store on New York's Fifth Avenue. Tokyo industrialists hope to develop coal, magnesium, and nickel deposits in Southeast Asia to feed Nippon's factories. E.S.

IN CLANGING shipyards skilled workers armed with electric welding torches fashion vessels—from 85,000-ton tankers to small fishing boats. The industry skyrocketed after the Korean conflict started a boom in world shipping. In modern shipyards that rival those in Hamburg or on the Clyde, construction moved so fast that soon one quarter of the world's new ships were launched in Japan. Latest equipment and improved construction methods enable Japan to compete successfully with Great Britain and West Germany, both leading shipbuilders.



PHOTOGRAPHS FROM SMITHSONIAN INSTITUTION

HOW IT REALLY WAS—One of the most popular of the Smithsonian's new exhibits is the Hall of First Ladies. There, grouped in authentic period rooms, the gowns of Presidents' wives from Martha Washington to Mamie Eisenhower are displayed. Each is the actual dress worn by the First Lady, often at her Inaugural Ball. The manikins show correct hair styles, but all have the same face—modeled after a statue of Shakespeare's Cordelia. Opened in May, 1955, the hall is one of the first in the Smithsonian's program of making its exhibits more instructive and more fun. Previously, the gowns were displayed side by side in a showcase. At left, Martha Washington sits in a Hepplewhite armchair that graced the Washingtons' Philadelphia home. With her are ladies she probably knew and entertained: Dolley Madison; Thomas Jefferson's daughter, Martha Randolph; and Abigail Adams.

***Adventures in Science at the Smithsonian, a color booklet, is available at $.25 from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.**

NATURE BROUGHT INDOORS—Many museums add popular appeal by careful reproduction of natural scenes. A family of Virginia deer (right) merge with their natural habitat in a Smithsonian display. For such groups workers add innumerable details to build a true representation of the woodland scene. Birds hide in the branches of preserved trees; stuffed mice and squirrels peer out. Even insects characteristic of the locale are included. In addition to the deer, the Smithsonian offers similar habitat groups of grizzly bears, mountain sheep and goats, moose, buffalo, and other large American mammals.

Backstage, Museum Experts Mine Knowledge

BEHIND THE EXHIBITS, the Smithsonian devotes itself to the other half of its motto.

World-renowned scientists peer at specimens—comparing, deducing, and proving—to increase the sum of man's knowledge.

The subject may be the skull of a hippopotamus, being examined below by A. Remington Kellogg, director of the United States National Museum (part of the Smithsonian) and a member of the National Geographic Society's research and exploration committee. It may be the intestine of a tropical beetle, the fossilized bones of a huge dinosaur, or the kitchen refuse of a prehistoric family.

B. ANTHONY STEWART, NATIONAL GEOGRAPHIC STAFF

Pure research is honored more and more in these days of international scientific competition. But still "practical men" occasionally ask of all this activity, "What good is it?"

"So you can catch a bug and put a name to it. What value is that?"

To such a question, research scientists might reply with an anecdote related in the new pamphlet, "Adventures in Science at the Smithsonian." *

During World War II, while America was bending every sinew toward victory, one Smithsonian expert went on writing a book about fleas. When published, a radio commentator declared it a waste of money, time, and paper. "There's a war on," the scientist was reminded.

The day after the broadcast, however, the Smithsonian received a letter from an Army doctor at the front.

Enclosed was a flea. The doctor wanted to know what kind it was and what he might do about it, since he suspected it carried a disease that had struck his troops.

Using books like the one that had been ridiculed, the Institution was able to tell the Army what action to take—thus saving many lives.

Today's giant liquid-fueled rockets roar from Cape Canaveral, Florida, to probe space and investigate the moon. Before World War I, the Smithsonian, as pure research, had sponsored the experiments of Dr. Robert Goddard, the American who laid the foundations of liquid-fuel rocketry. Goddard's information became so valuable recently that his out-of-print works were reissued for today's missilemen.

Studies of tiny "snapping shrimp" seemed of little value—until the advent of sonar in World War II. Then the sounds they make and their distribution became essential knowledge in submarine and antisubmarine operations.

Alaska, about to become the 49th and largest state, might not be part of the United States at all if it were not for Smithsonian expeditions into "Russian America" before its purchase in 1867.

Practically all the specific information on Alaska available in Washington was the fruit of these explorations. Smithsonian testimony before the Senate Foreign Relations Committee helped swing opinion toward the approval of the purchase treaty. F.S.

EVERY BEE IN THE HIVE is a child of the queen. Attended by a circle of workers (right), she roams the comb, laying a comma-shaped egg in each brood cell. Her attendants feed her "royal jelly" from glands in their heads. The queen can lay thousands of eggs in a single day, with a total weight exceeding her own.

Fertilized eggs produce female bees, unfertilized ones, drones. Diet controls whether a female egg will grow into a worker or a queen. At first, all grubs are fed royal jelly, but workers-to-be are soon switched to pollen. As shown in the sequence above, the eggs hatch into larvae, which spin cocoons and emerge as fully-formed bees. The painting also shows a queen depositing an egg (right).

From flowers bees take two different foods—pollen and nectar. The nectar is converted to honey, the pollen pressed into "bee bread." Both are eaten by workers, drones, and young. Bees work all summer to produce enough to feed the hive over the winter. Man takes the surplus honey.

BEES NEED ALL their well-publicized industry. The average worker will gather enough nectar for a teaspoonful of honey in her six-week life. Production of a pound of honey requires some 35,000 trips from the hive. The most popular container of honey —the 16-ounce bottle—holds the essence of 2,000,000 blossoms.

Honey is easy for man to digest because the bees do part of the job for him. They treat flower nectar with enzymes that break down its sweetness into simple sugars. Honey is used in baby-feeding formulas as a readily digestible body-builder. Athletes since the original Olympics have eaten honey for energy.

Male drone above; female worker below.

HONEYBEE WEARS DOUBLE HARNESS

Murmuring of Innumerable Insects Over Orchard and Field Insures Crop Pollination as Well as Honey Production

Paintings by Hashime Murayama

SCOURING THE FIELDS, orchards, and gardens of the United States, honeybees from five and a half millon hives buzzed out 252,000,000 pounds of honey this year.

But compared to their more important work this sweet flood was a mere drop in the jar.

The chief task of the honeybee—man's most numerous and industrious livestock—is the pollination of crops. Many food plants produce no seed or fruit unless pollinated by insects. Modern farming methods and insecticides have destroyed so many native insects that bees have been turned into migrant workers—their hives are trucked from area to area as different crops come into flower.

All the worker bees are females, such as the one hovering over a portulaca blossom at left. When gathering pollen to feed larvae, the bee literally rolls in the flower's yellow dust, catching the pollen in the hairs that cover her body. Then she combs it off and packs it securely in "baskets" on her rear legs for the trip to the hive.

When a worker happens on a rich patch of blossoms, she flies in a "beeline" home to tell her sisters about it. She dances on a honeycomb, jigging a straight line that indicates the direction of the find. The tempo of the dance shows distance—the slower the steps, the farther away is the nectar. And the scout carries the scent of the flowers on her body so the others know what to look for. Soon a flight of bees issues from the hive and heads straight toward the feast.

Scent also serves as an identification tag. Each hive develops its own odor. The bees drive away strange-smelling outsiders.

Male bees, or drones, such as the one in the close-up above, have no work to do. They laze about until their moment of glory—fertilizing the queen on a flight high in the air. After that, they die.

The farms that produce this cornucopia of protein are generally small, due mainly to laws that discourage mergers. Most farmsteads are of half-timbered construction, their walls showing white stucco between the beams or washed with blood-red ochre. Roofs green with moss cover the wide, low buildings which huddle together in a square surrounding an inner courtyard. The family usually lives in one wing, the cows, pigs, and horses in the others.

Like their counterparts in other Scandinavian countries, many Danish farmers turn to "producer's cooperatives" to sell what they produce. A farmer has a voice in the operation of each cooperative of which he is a member. A dairy farmer may sell part of his milk to a cooperative milk plant, another part to a cooperative cheese processing factory. Both milk and cheese, if exported, will likely be shipped abroad through a cooperative export company; some 80 percent of Denmark's agricultural produce is.

But not all good food leaves the country. There is plenty left to fill tempting tables in restaurants in Copenhagen and elsewhere. Café proprietors hang out signs which truthfully announce *God Mad*—"good food." Some serve up to a thousand customers at one sitting.

One belt-bursting specialty is *smørrebrød*—the Danish equivalent of an open-faced "Dagwood" sandwich. When a diner fearlessly orders one, the waiter presents him with a staggering assortment of smoked salmon and eel, roast veal, spiced ham, hard-cooked eggs, shrimps in mayonnaise, tongue, roast beef, salami, beets, cucumbers, liver paste, orange salad, and cold roast pork. The patron then proceeds to construct his own masterpiece. One Copenhagen restaurant needs a menu four feet long to list all of its 177 combinations for *smørrebrød*.

Next to food, Danes probably love fun best. In the center of the capital stands the Tivoli, an amusement park set in a garden. Its 30 acres are dotted with pagodas, mosques, temples, outdoor stages for tumblers, merry-go-rounds, even a lake. Tivoli was built in 1843 on the site of one of the city's ancient fortifications. Its designer, a master showman named Georg Carstensen, convinced King Christian VIII that the way to stop the people's grumbling demands for a new constitution was to give them an amusement center. But he lived to see the people outsmart him. They got their constitution too, six years later. Today, King Frederik IX, a constitutional monarch, walks the garden, doffing his hat to passers-by. A.P.M.

Farm-Rich Denmark

WITH A NEAT FLICK of her brush, the talented blonde lass puts her artistic trademark to another piece of famed Royal Copenhagen pottery. When painted, the vase will receive a coat of glaze, then endure two days and two nights of scorching heat in the kiln. It will emerge somewhat shrunken in size, but with subtle colors hard-baked into its surface, ready for export to an admiring collector in some corner of the world.

From earliest times, trade has played an important role in Denmark's destiny. Copenhagen, its capital, grew from a small fishing village to a thriving seaport. It stands at one of the three straits that make Denmark the guardian of the entrance to the Baltic Sea.

Through its ports flow the dairy products which have made Denmark Europe's butter-and-egg man. In certain recent years, this country only half the size of Maine has produced half the bacon and one fourth the butter and eggs moved in world trade. Like itinerant peddlers, her merchant ships ply from one country to another, offering agricultural products. Returning, they load coal, oil, fertilizer, textiles, and machinery.

Many a Londoner's breakfast is grown on the neat, green fields that make checkerboards of Denmark's more than 500 low-lying islands. The resourceful farmer, below, leading his lowing herd homeward, works a farm on Fyn, the major central island. But the scene could just as well be pictured on the large island of Zeeland to the east (where Copenhagen is located) or on the Jutland Peninsula to the west. Jutland, which points its long finger northward from Denmark's border with West Germany, stretches twice the length of Long Island. It boasts the largest egg-packing station in the country, at Skive, below. Here nimble-handed girls place the eggs on an automatic grading machine. Each egg weighs and sorts itself as it is moved along by the machine. The plant's huge cold storage vaults hold enough "henfruit" to provide an egg for breakfast for each citizen of, say, Plymouth, England.

PHOTOGRAPHS BY MAYNARD OWEN WILLIAMS

ERICA, TELLA STUDIO

'Wonderful, Wonderful Copenhagen'—Danish Door to the Sea

BENEATH THE BROWS of multicolored houses straight from the pages of one of Hans Christian Andersen's stories, Copenhagen's *fisherkones* (fishwives) noisily ply their trade. The offerings of their stalls can be sampled by visitors at one of the city's excellent sea-food restaurants, just across the cobbled quay in the heart of the city. The circular sign warns vehicles and pedestrians to stay off the busy piers. Like their Viking ancestors, Danes take eagerly to the sea. Few of the nation's four and a quarter million people live more than a long sniff from salt air. Deep-draft cargo ships berth hard against Copenhagen's main streets. A model ship, often the gift of some seafaring man, swings from the ceiling of many a church as an offering of thanks. Ships enter the capital's harbor from the Öresund, the narrow strait that separates Denmark from Sweden.